III. CLAIM AMENDMETS

1. (Currently Amended) A method for performing the operations for synchronizing a positioning receiver ~~(1)~~ with a received code-modulated spread spectrum signal, the ~~in which~~ method comprising:

using at least one reference code ~~(r(x))~~ ~~is used~~, which reference code corresponds to a code used in the modulation, acquiring the frequency shift of the received signal and the code phase of the code used in the modulation ~~are acquired~~, ~~**characterized** in that the method includes at least the following steps~~:

~~-sample vector formation step, in which~~

taking samples ~~(101) are taken~~ from the received signal for forming the sample vectors ~~(p(1), p(2)...p(N))~~,

~~-correlation step (102, 103, 104, 105), in which~~

forming a first Fast Hartley transform ~~($\overline{R}(x)$) is formed~~ on the basis of said reference code ~~(r(x))~~, and a second Fast Hartley transform ~~(P(i))~~ ~~is formed~~ on the basis of each sample vector ~~(p(1), p(2)...p(N))~~,

performing a multiplication ~~is performed~~ between the first Fast Hartley transform ~~($\overline{R}(x)$)~~ formed on the basis of said reference code and the second Fast Hartley transform ~~(P(i))~~ formed on the basis of each sample vector ~~(p(1), p(2)...p(N))~~,

performing an inverse Fast Hartley transform ~~is performed~~ on each multiplication result ~~($M_*(i)$)~~, and

~~-acquisition step (110), in which~~

acquiring the frequency shift and code phase ~~are acquired~~ on the basis of the inverse Fast Hartley transforms ~~($m_x(i)$)~~ of the multiplication results ~~($M_x(i)$)~~.

2. (Currently Amended) A method according to Claim 1, wherein ~~characterized in that in the method~~ the frequency range to be examined is specified, the specified frequency range is divided into two or more parts, whereupon said sample vector formation ~~step~~ and correlation ~~step~~ are performed on each part, ~~and that~~ the method also comprises an analysis ~~step~~, in which values of the inverse Fast Hartley transforms ~~($m_x(i)$)~~ of the multiplication results ~~($M_x(i)$)~~ are saved for forming a coherent search matrix ~~(A_x)~~, the acquisition ~~step~~ is performed after the examination of the specified frequency range, and the frequency shift and code phase are acquired on the basis of the highest value of the coherent search matrix ~~(A_x)~~.

3. (Currently Amended) A method according to Claim 2, wherein ~~characterized in that~~ a threshold value is specified ~~in the method~~, and ~~that~~ quantity values of the elements ~~($a_x(i,j)$)~~ of the coherent search matrix ~~(A_x)~~ that exceed said threshold value are used in the acquisition ~~step~~ for acquiring the frequency shift and code phase.

4. (Currently Amended) A method according to Claim 2, wherein ~~characterized in that~~ in ~~the method~~ said sample vector formation ~~step~~, correlation ~~step~~ and analysis ~~step~~ are repeated ~~(108)~~ for forming at least two coherent search matrixes ~~(A_x)~~, and ~~that~~ a summing ~~step (109)~~ is also performed in the method, in which

summing ~~step~~ an incoherent search matrix ~~(S_x)~~ is formed by summing incoherently the values ~~($a_x(i,j)$)~~ of the equivalent elements of the coherent search matrix ~~(A_x)~~ formed at each time of repetition, and ~~that~~ said incoherent search matrix ~~(S_x)~~ is used in said acquisition ~~step~~ for acquiring the frequency shift and code phase.

5. (Currently Amended) A method according to Claim 4, wherein ~~characterized in that in the method~~ the frequency range to be examined is specified, the specified frequency range is divided into two or more parts, whereupon said sample vector formation ~~step~~, correlation ~~step~~, analysis ~~step~~ and summing ~~step~~ are performed on each part, and values of the elements of the incoherent search matrix ~~(S_x)~~ are saved, and ~~that~~ the acquisition ~~step~~ is performed after the examination of the specified frequency range, and the frequency shift and code phase are acquired on the basis of the highest value.

6. (Currently Amended) A method according to Claim 4, wherein ~~characterized in that~~ a threshold value is determined ~~in the method~~, and ~~that~~ quantity values of the elements of the incoherent search matrix ~~(S_x)~~ that exceed said threshold value are used in the acquisition ~~step~~ for acquiring the frequency shift and code phase.

7. (Currently Amended) A method according to claim 1, wherein ~~characterized in that~~ an inverse code ~~($\bar{r}(x)$)~~ corresponding to said reference code ~~($r(x)$)~~ is used in the correlation ~~step~~ to form the first Fast Hartley transform ~~($\bar{R}(x)$)~~.

8. (Currently Amended) A method according to claim 1, wherein ~~characterized in that~~ an inverse code corresponding to each sample vector ~~(p(1), p(2)...p(N))~~ is used in the correlation ~~step~~ to form the second Fast Hartley transform ~~($\overline{P}(i)$)~~.

9. (Currently Amended) A positioning system, which comprises at least a positioning receiver ~~(1)~~, synchronization means ~~(6)~~ for performing synchronization operations to a received code-modulated spread spectrum signal, means ~~(16)~~ for using at least one reference code ~~(r(x))~~ in connection with the synchronization, which reference code ~~(r(x))~~ corresponds to a code used in the modulation, and means ~~(15)~~ for acquiring the frequency shift of the received signal and the code phase of the code used in the modulation, ~~characterized in that~~ wherein the synchronization means comprises ~~comprise at least~~:

- sample vector formation means ~~(12, 16)~~ for forming sample vectors ~~(p(1), p(2)...p(N))~~ from the received signal,
- correlation means ~~(6, FHT1, FHT2...FHTN)~~ for forming a first Fast Hartley transform ~~($\overline{R}(x)$)~~ on the basis of said reference code ~~(r(x))~~, and for forming a second Fast Hartley transform ~~(P(i))~~ on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, means for performing a multiplication between the first Fast Hartley transform ~~($\overline{R}(x)$)~~ formed on the basis of said reference code and the second Fast Hartley transform ~~(P(i))~~ formed on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, and means for performing an inverse Fast Hartley transform on each multiplication result ~~($M_x(i)$)~~ for forming a correlation function matrix ~~(C_x)~~, and

- acquisition means ~~(7, 17)~~ for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms ~~(m_x(i))~~ of the multiplication results ~~(M_x(i))~~.

10. (Currently Amended) A positioning system according to Claim 9, wherein ~~characterized in that~~ the received signals are signals transmitted by satellites of the GPS system.

11. (Currently Amended) A positioning system according to Claim 9, which comprises a data transfer network, and ~~characterized in that~~ at least part of the synchronization means ~~(6)~~ are formed in connection with the data transfer network, and ~~that~~ a data transfer connection is arranged to be established between the data transfer network and the receiver ~~(1)~~.

12. (Currently Amended) A positioning system according to Claim 11, wherein ~~characterized in that~~ the data transfer network comprises ~~at least~~ a mobile communication network.

13. (Currently Amended) A positioning system according to Claim 9, wherein ~~characterized in that~~ the synchronization means ~~(6)~~ are formed in the receiver ~~(1)~~.

14. (Currently Amended) A positioning receiver ~~(1)~~, which comprises at least synchronization means ~~(6)~~ for performing synchronization operations to a received code-modulated spread spectrum signal, said receiver ~~(1)~~ has means ~~(16)~~ for using at least one reference code ~~(r(x))~~ in connection with the synchronization, the reference code ~~(r(x))~~ corresponding to a code used in the modulation, and means ~~(15)~~ for acquiring the frequency shift of the received signal and the code phase of the

code used in the modulation, ~~characterized in that~~ the synchronization means~~—~~comprising ~~comprise at least~~:

- sample vector formation means ~~(12, 16)~~ for forming sample vectors ~~(p(1), p(2)...p(N))~~ from the received signal,
- correlation means ~~(6, FHT1, FHT2...FHTN)~~ for forming a first Fast Hartley transform ~~($\bar{R}(x)$)~~ on the basis of said reference code ~~(r(x))~~, and for forming a second Fast Hartley transform ~~(P(i))~~ on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, means for performing a multiplication between the first Fast Hartley transform ~~($\bar{R}(x)$)~~ formed on the basis of said reference code and the second Fast Hartley transform ~~(P(i))~~ formed on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, and means for performing an inverse Fast Hartley transform on each multiplication result ~~($M_x(i)$)~~ for forming a correlation function matrix ~~(C_x)~~, and
- acquisition means ~~(7, 17)~~ for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms ~~($m_x(i)$)~~ of the multiplication results ~~($M_x(i)$)~~.

-

15. (Currently Amended) A receiver ~~(1)~~ according to Claim 14, further comprising: ~~characterized in that it also comprises at least~~

- means ~~(17)~~ for specifying the frequency range to be examined, means ~~(5, 8, 9)~~ for dividing the specified frequency range into two or more parts, whereupon the formation of the sample vectors and the formation of the correlation function matrix ~~(C_x)~~ are arranged to be performed for each part,
- means for forming a coherent search matrix ~~(A_x)~~,

- means ~~(16)~~ for saving the values of the elements ~~($a_x(i,j)$)~~ of the coherent search matrix ~~(A_x)~~, and
- means ~~(15)~~ for determining the frequency shift and code phase on the basis of the highest value of the coherent search matrix ~~(A_x)~~.

16. (Currently Amended) A receiver ~~(1)~~ according to Claim 14, further comprising ~~.characterized in that it comprises~~ means ~~(15)~~ for specifying the threshold value, and means ~~(15)~~ for comparing the values of said threshold value and the values of said coherent search matrix ~~(A_x)~~ for determining the frequency shift and code phase.

17. (Currently Amended) A receiver ~~(1)~~ according to Claim 14, wherein in~~characterized in that~~ said formation of sample vectors, formation of a correlation function matrix ~~(C_x)~~ and formation of a coherent search matrix ~~(A_x)~~ are arranged to be repeated at least two times for forming a coherent search matrix ~~($A_{x,k}$)~~, and ~~that~~ the receiver ~~(1)~~ also comprises summing means for forming an incoherent search matrix ~~(S_x)~~ by summing the values ~~($a_{x,k}(i,j)$)~~ of the equivalent elements of the coherent search matrix ~~(A_x)~~ formed at each time of repetition, and ~~that~~ said incoherent search matrix ~~(S_x)~~ is used in the acquisition step for determining the frequency shift and code phase.

18. (Currently Amended) A receiver ~~(1)~~ according to Claim 14, further comprising:~~characterized in that it also comprises at least~~
- means ~~(17)~~ for specifying the frequency range to be examined,

- means ~~(5, 8, 9)~~ for dividing the specified frequency range into two or more parts, whereupon the formation of the sample vectors and the formation of the correlation function matrix ~~(C_x)~~ are arranged to be performed for each part,
- means for forming a coherent search matrix ~~(A_x)~~,
- means for summing the coherent search matrix ~~(A_x)~~ to the incoherent search matrix ~~(S_x)~~,
- means ~~(16)~~ for saving the values of the elements of the incoherent search matrix ~~(S_x)~~, and
- means ~~(15)~~ for determining the frequency shift and code phase on the basis of the highest value.

19. (Currently Amended) A receiver ~~(1)~~ according to Claim 18, further comprising~~characterized in that it comprises~~ means ~~(15)~~ for specifying the threshold value, and means ~~(15)~~ for comparing the values of said threshold value and the values of said incoherent search matrix ~~(S_x)~~ for determining the frequency shift and code phase.

20. (Currently Amended) A receiver ~~(1)~~ according to claim 14, wherein ~~characterized in that~~ the correlation means comprise means ~~(16)~~ for forming a Fast Hartley transform ~~($\bar{R}(x)$)~~ of the inverse code ~~($\bar{r}(x)$)~~ corresponding to said reference code ~~(r(x))~~.

21. (Currently Amended) A receiver ~~(1)~~ according to claim 14, wherein ~~characterized in that~~ the correlation means comprise means ~~(16)~~ for forming a Fast Hartley transform ~~($\bar{P}(i)$)~~ of the inverse code corresponding to each sample vector ~~(p(1), p(2)...p(N))~~.

22. (Currently Amended) An electronic device ~~(24)~~, which comprises at least a location determination positioning receiver ~~(1)~~, synchronization means ~~(6)~~ for performing synchronization operations of the location determination receiver ~~(1)~~ to a transmitted code-modulated spread spectrum signal, and in which the location determination receiver ~~(1)~~ includes means ~~(16)~~ for using at least one reference code ~~(r(x))~~ in connection with the synchronization, the reference code ~~(r(x))~~ corresponds to a code used in the modulation, and the electronic device comprises means ~~(15)~~ for determining the frequency shift of the transmitted signal and the code phase of the code used in the modulation, wherein ~~characterized in that~~ the synchronization means comprises ~~comprise at least~~:

- sample vector formation means ~~(12, 16)~~ for forming sample vectors ~~(p(1), p(2)...p(N))~~ from the received signal,
- correlation means ~~(6, FHT1, FHT2...FHTN)~~ for forming a first Fast Hartley transform ~~($\overline{R}(x)$)~~ on the basis of said reference code ~~(r(x))~~, and for forming a second Fast Hartley transform ~~(P(i))~~ on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, means for performing a multiplication between the first Fast Hartley transform ~~($\overline{R}(x)$)~~ formed on the basis of said reference code and the second Fast Hartley transform ~~(P(i))~~ formed on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, and means for performing an inverse Fast Hartley transform on each multiplication result ~~($M_x(i)$)~~ for forming a correlation function matrix ~~(C_x)~~, and
- acquisition means ~~(7, 17)~~ for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms ~~($m_x(i)$)~~ of the multiplication results ~~($M_x(i)$)~~.

23. (Currently Amended) An electronic device ~~(24)~~ according to Claim 22, which comprises means ~~(14, 15, 17)~~ for determining the location of the electronic device ~~(24)~~ and means ~~(18)~~ for saving the location information, wherein ~~characterized in that~~ the electronic device ~~(24)~~ also comprises means ~~(17)~~ for specifying the frequency range to be examined, and means ~~(17, 22, 23)~~ for selecting the starting frequency from said frequency range on the basis of the location information saved in the receiver ~~(1)~~.

24. (Currently Amended) An electronic device ~~(24)~~ according to Claim 22, wherein ~~characterized in that~~ the correlation means comprise means ~~(16)~~ for forming a Fast Hartley transform ~~($\bar{R}(x)$)~~ of the inverse code ~~($\bar{r}(x)$)~~ corresponding to said reference code ~~(r(x))~~.

25. (Currently Amended) An electronic device ~~(24)~~ according to Claim 22, wherein ~~characterized in that~~ the correlation means comprise means ~~(16)~~ for forming a Fast Hartley transform ~~($\bar{P}(i)$)~~ of the inverse code corresponding to each sample vector ~~(p(1), p(2)...p(N))~~.

26. (Currently Amended) An electronic device ~~(24)~~ according to Claim 22, further comprising ~~characterized in that~~ it also comprises means for performing data transfer operations.

27. (Currently Amended) An electronic device ~~(24)~~ according to Claim 26, further comprising ~~characterized in that it comprises~~ means ~~(22, 23)~~ for establishing a data transfer connection to a data transfer network, whereby the means for determining the location of the electronic device ~~(24)~~ comprise means ~~(22, 23)~~

for transmitting information needed in the location determination to the data transfer network, and means ~~(22, 23)~~ for retrieving information used in the location determination from the data transfer network, whereby at least part of the location determination operations are arranged to be performed in the data transfer network.

28. (Currently Amended) An electronic device ~~(24)~~ according to Claim 26, wherein ~~characterized in that~~ the means for performing data transfer operations comprise ~~at least~~ means for performing mobile station operations.

29. (Currently Amended) An electronic device ~~(24)~~, which comprises at least a positioning receiver ~~(1)~~ and which electronic device ~~(24)~~ is intended for use in connection with a positioning system, which comprises ~~at least~~ synchronization means ~~(6)~~ for performing synchronization operations of the receiver ~~(1)~~ to a transmitted code-modulated spread spectrum signal, means ~~(16)~~ for using at least one reference code ~~(r(x))~~ in connection with the synchronization, the reference code ~~(r(x))~~ corresponding to a code used in the modulation, means ~~(15)~~ for determining the frequency shift of the transmitted signal and the code phase of the code used in the modulation, and a data transfer network, ~~characterized in that~~ wherein the electronic device ~~(24)~~ also comprises ~~at least~~ sample vector formation means ~~(12, 16)~~ for forming sample vectors ~~(p(1), p(2)...p(N))~~ from the received signal, and transmission means ~~(22, 23)~~ for transmitting the sample vectors ~~(p(1), p(2)...p(N))~~ and time information to the data transfer network, and ~~that~~ the positioning system also comprises ~~at least~~:

- correlation means ~~(6, FHT1, FHT2...FHTN)~~ for forming a first Fast Hartley transform ~~($\overline{R}(x)$)~~ on the basis of said reference code ~~(r(x))~~, and for forming a second Fast Hartley transform ~~(P(i))~~ on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, means for performing a multiplication between the first Fast Hartley transform ~~($\overline{R}(x)$)~~ formed on the basis of said reference code and the second Fast Hartley transform ~~(P(i))~~ formed on the basis of each sample vector ~~(p(1), p(2)...p(N))~~, and means for performing an inverse Fast Hartley transform on each multiplication result ~~($M_*(i)$)~~ for forming a correlation function matrix ~~(C_x)~~, and
- acquisition means ~~(7, 17)~~ for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms ~~($m_*(i)$)~~ of the multiplication results ~~($M_*(i)$)~~.

30. (Currently Amended) An electronic device ~~(24)~~ according to Claim 29, further comprising ~~characterized in that it also comprises~~ reception means ~~(23, 22)~~ for receiving information about the acquired frequency shift and code phase from the data transfer network.

31. (Currently Amended) An electronic device ~~(24)~~ according to Claim 29, which is intended for use in connection with a positioning system, and which also comprises ~~at least~~ means ~~(26)~~ for determining the location of an electronic device, ~~characterized in that the electronic device (24) also comprises~~ and means ~~(22, 23)~~ for receiving location information from the data transfer network.

32. (Currently Amended) An electronic device ~~(24)~~ according to Claim 29, wherein ~~characterized in that~~ the means for performing

data transfer operations comprise ~~at least~~ means for performing mobile station operations.